

REFERENCES

- Akib, A. M. A. M., bin Saad, N., Asirvadam, V. (2011). Pressure point analysis for early detection system. *In: Signal Processing and its Applications (CSPA), 2011 IEEE 7th International Colloquium*, 103-107.
- Bagajewicz, M., Valtinson, G. (2014). Leak detection in gas pipelines using accurate hydraulic models. *Industrial & Engineering Chemistry Research*, 53(44): 16964-16972.
- Beck, S., Foong, J., Staszewski, W. (2006). Wavelet and cepstrum analyses of leaks in pipe networks. *13th European Conference on Mathematics of Industry, ECMI*, 8: 559-563.
- Beck, S., Staszewski, W. (2004). Cepstrum analysis for identifying reflection points in pipeline networks. *Proceedings Of The International Conference On Pressure Surges*, 1: 199-210.
- Bernasconi, G., Del Giudice, S., Giunta, G. (2012). Pipeline acoustic monitoring. *7th Pipeline Technology Conference 2012*.
- Billman, L. and Isermann, R. (1984). Leak detection methods for pipelines. *Proceeding of the 8th IFAC Congress*, 1813–1818.
- Brodetsky, I., Savic, M. (1993). Leak monitoring system for gas pipelines. *In: Acoustics, Speech, and Signal Processing, 1993. ICASSP-93, 1993 IEEE International Conference*. 3: 17-20.
- Burn, S., DeSilva, D., Eiswirth, M., Hunaidi, O., Speers, A., Thornton, J. (1999). Pipe leakage–future challenges and solutions. *Pipes Wagga Wagga, Australia*.
- Burrus, C. S., Gopinath, R. A., Guo, H. (1998). *Introduction to wavelet and wavelet transforms*. Prentice hall. New York.
- Byron, F. W., Fuller, R. W. (2012). *Mathematics of classical and quantum physics*. Courier Corporation.
- Cerda, J. (August 2011). Oil pipeline logistics. Slide. Pan American Study Institute on Emerging Trends in Process Systems Engineering.
- Civan, F. and Balda, K. V. (2013). Application of mass balance and transient flow modeling for leak detection in liquid pipelines. *In: SPE Production and Operations Symposium, Oklahoma City, Oklahoma, USA. Society of Petroleum Engineers*. 23-26.

- ClampOn, (August 2014). Clampon dsp leak monitor. (online) <http://www.clampon.com/products/topside/leak-monitor/downloads/> (2 Sept 2014).
- Colombo, A., Karney, B., (2003). Pipe breaks and the role of leaks from an economic perspective. *Water Science and Technology: Water Supply*. 3(1-2): 163-169.
- Doorhy, J., (2011). Real-time pipeline leak detection and location using volume balancing. *Pipeline Gas J.* 238(2): 65-67.
- DOSH, (2011). Explosion of liquefied petroleum gas (LPG) in a supermarket. (online) http://www.dosh.gov.my/index.php?option=com_content&view=article&id=330:explosion-of-liquefied-petroleum-gas-lpg-in-a-supermarket&catid=438&Itemid=692&lang=en. (15 June 2015)
- El-Shiekh, T. (2010). Leak detection methods in transmission pipelines. *Energy Sources, Part A: Recovery, Utilization, and Environmental Effects*. 32(8): 715-726.
- Flandrin, P., Goncalves, P. (2004). Empirical mode decompositions as data-driven wavelet-like expansions. *International Journal of Wavelets, Multiresolution and Information Processing*. 2(04): 477-496.
- Folga, S. (2007). Natural gas pipeline technology overview. Tech. rep., Argonne National Laboratory (ANL).
- Fukushima, K., Maeshima, R., Kinoshita, A., Shiraishi, H., Koshijima, I. (2000). Gas pipeline leak detection system using the online simulation method. *Computers & Chemical Engineering*. 24(27): 453-456.
- Ghazali, M. F., (2012). Leak detection using instantaneous frequency analysis. Ph.D. thesis, University of Sheffield.
- Ghazali, M. F., Beck, S. B. M., Shucksmith, J. D., Boxall, J. B., Staszewski, W. J. (2012). Comparative study of instantaneous frequency based methods for leak detection in pipeline networks. *Mechanical Systems and Signal Processing* 29: 187-200.
- Gas Malaysia Berhad, 2015. Supply concept. (online) <http://www.gasmalaysia.com/index.php/our-services/natural-gas/supply-concept/> (15-November-2015).
- Golby, J., Woodward, T. (1999). Find that leak (digital signal processing Approach). *IEE review*. 45(5): 219-221.
- Hafezi, M. M., Mirhosseini, M. (2015). Application of cross-correlation in pipe condition assessment and leak detection; using transient pressure and acoustic waves. *Resources and Environment*. 5(5): 159-166.

- Hedeng, Y., Laibing, Z., Wei, L., Yingchun, Y., Yijing, R. (2012). Study of gas pipeline leak detection based on hilbert marginal spectrum. *In: Computational and Information Sciences (ICCIS), 2012 Fourth International Conference on. IEEE.* 1259-1262.
- Heller, E. J. (2012). *Why you hear what you hear: an experiential approach to sound, music, and psychoacoustics.* Princeton University Press.
- Huang, N. E., Attoh-Okine, N. O. (2005). *The Hilbert-Huang Transform in Engineering.* First Edition. CRC Press.
- Huang, N. E., Shen, Z., Long, S. R., Wu, M. C., Shih, H. H., Zheng, Q., Yen, N.-C., Tung, C. C., Liu, H. H. (1998). The empirical mode decomposition and the hilbert spectrum for nonlinear and non-stationary time series analysis. *In: Proceedings of the Royal Society of London A: Mathematical, Physical and Engineering Sciences.* 454: 903-995.
- Huang, N. E., Wu, M.-L. C., Long, S. R., Shen, S. S., Qu, W., Gloersen, P., Fan, K. L. (2003). A confidence limit for the empirical mode decomposition and hilbert spectral analysis. *In: Proceedings of the Royal Society of London A: Mathematical, Physical and Engineering Sciences.* 459 2317-2345.
- Huang, N. E., Wu, Z. (2008). A review on hilbert-huang transform: Method and its applications to geophysical studies. *Reviews of Geophysics.* 46(2).
- Ikuta, K., Yoshikane, N., Vasa, N., Oki, Y., Maeda, M., Uchiumi, M., Tsumura, Y., Nakagawa, J., Kawada, N. (1999). Differential absorption lidar at 1.67 μm for remote sensing of methane leakage. *Japanese Journal of Applied Physics.* 38(1R): 110.
- Ingard, U., Singhal, V. K. (1974). Sound attenuation in turbulent pipe flow. *The Journal of the Acoustical Society of America.* 55(3): 535-538.
- Jia, Y., Gao, B., Jiang, C., Chen, S. (2012). Leak diagnosis of gas transport pipelines based on hilbert-huang transform. *International Conference on Measurement, Information and Control (MIC).* 2: 614-617.
- Kennedy, J. (2005). A nose for trouble. *Oil & Gas.* 32-37.
- Kim, M.-S., Lee, S.-K. (2009). Detection of leak acoustic signal in buried gas pipe based on the time-frequency analysis. *Journal of Loss Prevention in the Process Industries.* 22(6): 990-994.
- Li, S., Wen, Y., Li, P., Yang, J., Dong, X., Mu, Y. (2014). Leak location in gas pipelines using cross-time-frequency spectrum of leakage-induced acoustic vibrations. *Journal of Sound and Vibration.* 333(17): 3889-3903.

- Li, Z. (2011). An ensemble empirical mode decomposition approach to wear particle detection in lubricating oil subject to particle overlap. Ph.D. thesis, University of Ottawa.
- Liou, J. C. (1996). Leak detection by mass balance effective for normal wells line. *Oil and gas journal*. 94(17).
- Liu, M., Zang, S., Zhou, D. (2005). Fast leak detection and location of gas pipelines based on an adaptive particle filter. *International Journal of Applied Mathematics and Computer Science*. 15(4): 541.
- Loth, J., Morris, G. J., Palmer, G. M., Guiler, R., Mehra, D. (2003). Technology assessment of on-line acoustic monitoring for leaks/infringements in underground natural gas transmission lines. USA: West Virginia University.
- Lowry, W. E., Dunn, S. D., Walsh, R., Merewether, D., Rao, D. V., et al. (Mar. 14 2000). Method and system to locate leaks in subsurface containment structures using tracer gases. US Patent 6,035,701.
- Majid, Z., and Mohsin, R. (2012). Failure investigation of natural gas pipeline. *Arabian journal for Science and Engineering*. 37(4): 1083-1088.
- Marrin, D. L., Kerfoot, H. B. (1988). Soil-gas surveying techniques. *Environmental science & technology*. 22(7): 740-745.
- McGeehan, P., and Ham, J. (March 28 2015). Months before east village blast, utility found gas line was tapped in dangerous way. *The New York Times*. March 28 2015.
- Meng, L., Yuxing, L., Wuchang, W., Juntao, F. (2012). Experimental study on leak detection and location for gas pipeline based on acoustic method. *Journal of Loss Prevention in the Process Industries*. 25(1): 90-102.
- Morrow, G., Dickerson, P. (2014). Leak sensitivity, location accuracy and robustness in natural gas pipelines. In: PSIG-1406. Pipeline Simulation Interest Group.
- Mostafapour, A., Davoodi, S. (2013). Leakage locating in underground high pressure gas pipe by acoustic emission method. *Journal of Nondestructive Evaluation*. 32(2): 113-123.
- Muhlbauer, W. K. (2004). *Pipeline risk management manual: ideas, techniques, and resources*. Gulf Professional Publishing.
- Murway, P.-S., Silea, I. (2012). A survey on gas leak detection and localization techniques. *Journal of Loss Prevention in the Process Industries*. 25(6): 966-973.

- Papadopoulou, K., Shamout, M., Lennox, B., Mackay, D., Taylor, A., Turner, J., Wang, X. (2008). An evaluation of acoustic reflectometry for leakage and blockage detection. *Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science*. 222(6): 959-966.
- Parry, B., Mactaggart, R., Toerper, C. (1992). Compensated volume balance leak detection on a batched lpg pipeline. In: *Proceedings of the International Conference on Offshore Mechanics and Arctic Engineering. American Society of Mechanical Engineers*. 501-501.
- Polikar, R. (1996). The wavelet tutorial. (online) <http://users.rowan.edu/polikar/WAVELETS/WTtutorial.html> (10 May 2014).
- Quaife, L., . A. D. (1993). Pipeline leak location technique using a novel test. Report.
- Rahim, K. A., Liwan, A. (2012). Oil and gas trends and implications in malaysia. *Energy Policy*. 50: 262-271
- Reichardt, T., Devdas, S., Kulp, T., Einfeld, W. (2002). Evaluation of active and passive gas imagers for transmission pipeline remote leak detection. In: *Natural Gas Infrastructure Reliability Industry Forum September*. 16-17.
- Rienstra, S. W., Hirschberg, A. (2003). *An introduction to acoustics*. Eindhoven University of Technology 18, 19.
- Rocha, M. (1989). Acoustic monitoring of pipeline leaks. In: *ISA Calgary 1989 Symposium-Paper*. 89-0333: 283-290.
- Rougier, J. (2005). Probabilistic leak detection in pipelines using the mass imbalance approach. *Journal of Hydraulic Research*. 43(5): 556-566.
- Sandberg, C., Holmes, J., Mccoy, K., Koppitsch, H. (1989). The application of a continuous leak detection system to pipelines and associated equipment. *Industry Applications, IEEE Transactions*. 25(5): 906-909.
- Santos, R., de Sousa, E., da Silva, F., da Cruz, S., Fileti, A. (2013). Real-time monitoring of gas pipeline through artificial neural networks. In: *Computational Intelligence and 11th Brazilian Congress on Computational Intelligence (BRICS-CCI & CBIC), 2013 BRICS Congress on. IEEE*. 329-334.
- Scott, S. L., Barrufet, M. A. (2003). Worldwide assessment of industry leak detection capabilities for single & multiphase pipelines. Tech. rep., Texas A&M University.
- Sharp, D. B., Campbell, D. M. (1997). Leak detection in pipes using acoustic pulse reflectometry. *Acta Acustica united with Acustica*. 83(3): 560-566.

- Shimanskii, S., Strelkov, B., AnanEv, A., Lyubishkin, A., Iijima, T., Mochizuki, H., Kasai, Y., Yokota, K., Kanazawa, J. (2005). Acoustic method of leak detection using high-temperature microphones. *Atomic Energy*. 98(2): 89-96.
- Silva, R. A., Buiatti, C. M., Cruz, S. L., Pereira, J. A. (1996). Pressure wave behaviour and leak detection in pipelines. *Computers & Chemical Engineering* 20. S491-S496.
- Taghvaei, M., Beck, S. B. M., Staszewski, W. J. (2006). Leak detection in pipelines using cepstrum analysis. *Measurement Science and Technology*. 17(2): 367.
- Tao, L., Groves, K., Lennox, B. (2015). The simulation of acoustic wave propagation within networked pipe systemsdevelopment and experimental validation. *The 22nd International Congress of Sound and Vibration*.
- Thompson, G. (Dec. 1 1987). System for continuously monitoring for leaks in underground storage tanks. US Patent 4,709,577.
- Tolstoy, A., Horoshenkov, K., Ali, M. B. (2009). Detecting pipe changes via acoustic matched field processing. *Applied Acoustics*. 70(5): 695-702.
- Upton, J. (2014). A week after alaska oks a big gas pipeline, another gas pipeline ruptures. (online). <http://grist.org/news/a-week-after-alaska-oks-a-big-gas-pipeline-another-gas-pipeline-ruptures/> (19 December 2014).
- Urbanek, J., Barszcz, T., Uhl, T., Staszewski, W., Beck, S., Schmidt, B. (2012). Leak detection in gas pipelines using wavelet-based filtering. *Structural Health Monitoring*. 11(4): 405-412.
- Polyethylene Properties, 2015. (online) <http://www.vinidex.com.au/technical/material-properties/polyethylene-properties/> (02-May-2015).
- Wang, X., Lennox, B., Ding, Z., Turner, J., Lewis, K. (2009a). Blockage detection in long lengths of pipeline using a new acoustic method. In: *Sixteenth Congress on Sound and Vibration, Krakow*.
- Wang, X., Short, G., Dawson, K., Lennox, B. (2009b). Acoustic reflectometry for gas pipelines-monitoring features in gas pipelines using acoustek.
- Watanabe, K., Himmelblau, D. M. (1986). Detection and location of a leak in a gas-transport pipeline by a new acoustic method. *AIChE Journal*. 32(10): 1690-1701.
- Webb, R. (2015). Recent pipeline explosions highlight the need for tougher regulation of gas leaks. *The Kay Bailey Hutchison Center for Energy, Law, and Business*.

- Wu, Z., Huang, N. E. (2009). Ensemble empirical mode decomposition: a noise-assisted data analysis method. *Advances in adaptive data analysis*. 1(01): 1-41.
- Xu, J., Zhang, P., Shan, F., Nie, Z., Yu, Y., Mo, J., Luo, Y. (2013). An Improved Method of Leak Detection Used in Natural Gas Pipelines. Ch. 106, pp. 1051–1066.
- Yang, Z., Xiong, Z., Shao, M. (2010). A new method of leak location for the natural gas pipeline based on wavelet analysis. *Energy*. 35(9): 3814-3820.
- Yunus, U., Tsunasaki, M., He, Y., Kominami, M. (November 2006). Discontinuity detection of pipeline with sound wave. *IEEEJ Trans. C*. 126: 1344-1350.
- Yunus, U., Tsunasaki, M., He, Y., Kominami, M., Yamashita, K. (Aug. 2008). Detection of leak location in a pipeline by acoustic signal. *IEICE Trans. Fundam. Electron. Commun. Comput. Sci*. E91-A(8): 2053-2061.
- Zhang, D. J., Twomey, M. (2000). Statistical pipeline leak detection techniques for all operating conditions. In: *26th Environmental Symposium & Exhibition, California*. 285-290.
- Zhang, T., Tan, Y., Zhang, X., Zhao, J. (2015). A novel hybrid technique for leak detection and location in straight pipelines. *Journal of Loss Prevention in the Process Industries*. 35: 157-168.